



# New Generation of Physical Ranges for Infantry Training: Bringing in Sensor Systems and VR Technologies

Amela Sadagic, Ph.D.  
MOVES Research Associate Professor

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>JUL 2010</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2010 to 00-00-2010</b>	
4. TITLE AND SUBTITLE <b>New Generation of Physical Ranges for Infantry Training: Bringing in Sensor Systems and VR Technologies</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Naval Postgraduate School,MOVES Institute,Monterey,CA,93943</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>10th Annual MOVES Research and Education Summit 2010, 13-15 July.</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>14</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



MOVES





# M&S Solutions in Training Domain

## Now/majority of solutions:

- Support Live-Virtual-Constructive sub-division
- Advocate a replacement of training on physical ranges with training using simulations

## ISSUES to be considered:

- Training needs
- Is such subdivision productive?

# We propose...

Go for an organic, eclectic mix of training approaches, technologies, systems and tools that support training objectives in given training environment, most effectively:

- They feed into (and off) each other
- They cover the largest portion of training cycle
- They serve majority of users (instructors & trainees)

→ Recognize & respect the input from domain / end users: they are your team members

# Ranges for Urban Warfare: outdoor

**Now:** a set of disjoint 2D video streams



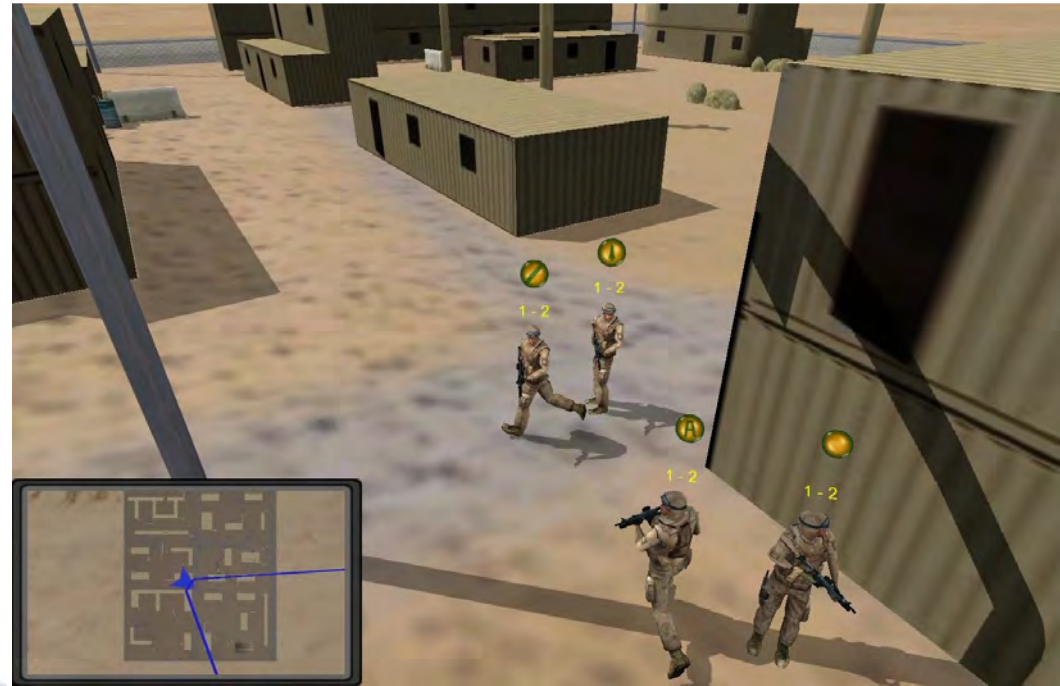
# Ranges for Urban Warfare: outdoor

**Future: “BASE-IT” approach**

**real time 2D**

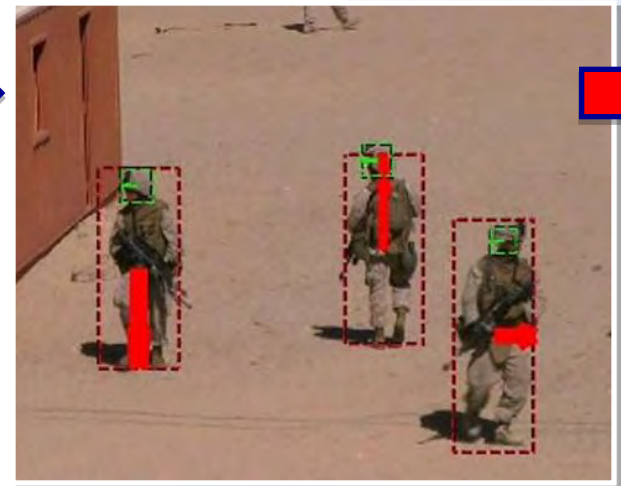


**real time 3D**





# Technologies Used

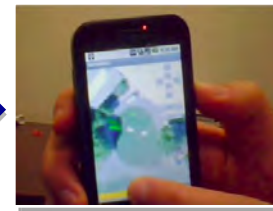
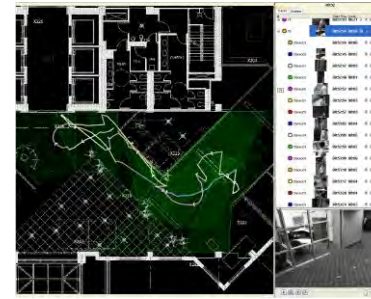
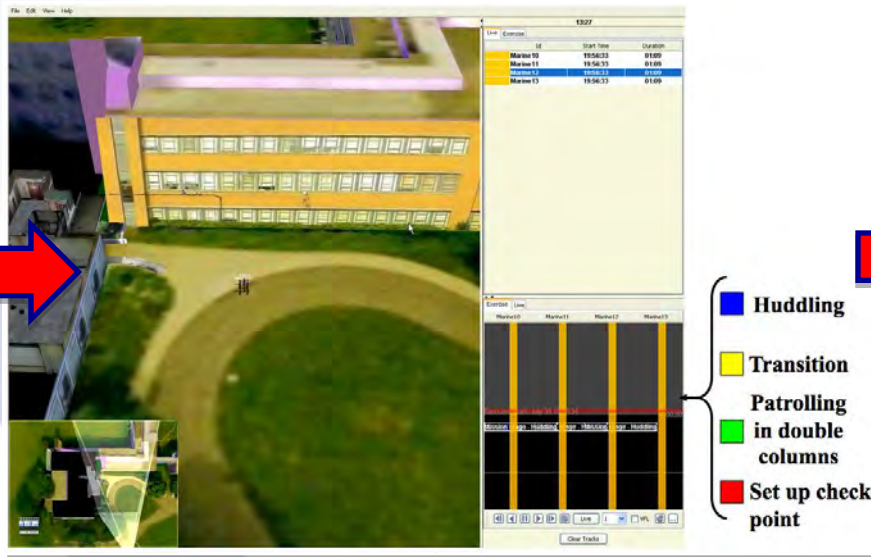


**Multi-sensor system** (USMC cameras, GPS & IMUs) with automated calibration & camera management

**Marine tracking:** Derive high precision multidimensional data sets with 3D position, posture, head / torso / weapon orientation



# Technologies Used



Conduct **automated behavior analysis** - recognize basic and complex behaviors, and provide **automated performance evaluation** for teams and individuals

**Visualize data** and results of behavior analysis on multiple platforms, and enable quick searches and “free play” (behavior synthesis)

# Military Relevance & Operational Impact

- Enhanced preparation for training in urban warfare: play-back and analysis of training runs conducted by other units, intuitive tools for mission planning.
- Improved effectiveness of After Action Review: Instructors provided with quantitative measures about unit performance,
- Smart searches & quick review of recorded unit performances (3D data) and 'what-if' scenarios.
- USMC-wide benefits: analysis of historical data and trends across many units.

# Ranges for Urban Warfare: indoor

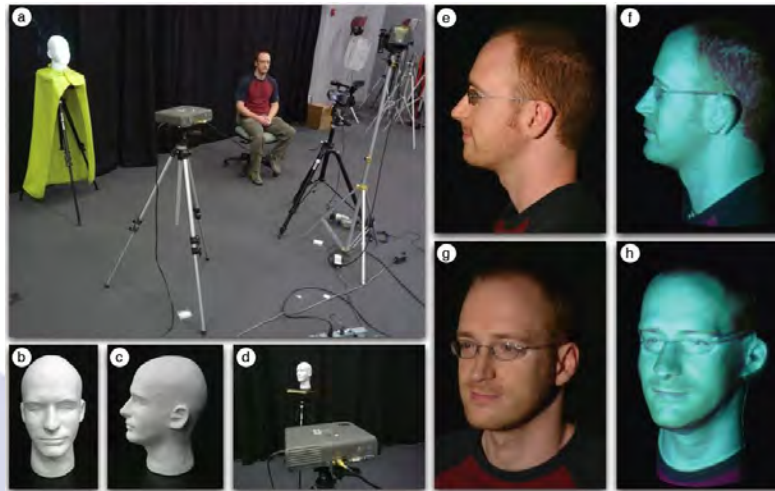
**Now:** 2D virtual humans





# Ranges for Urban Warfare: indoor

- **Future:** “3D Display and Capture of Humans for Live-Virtual Training” approach



## 2 Demo Stations (Wednesday evening)



Virtual Sand-Table

WA- 212A

13 Jul, 2010



3D Virtual Humans

WA-212B

12

# Shameless Plug-in...

We have 2 National Research Council (NRC)  
PostDoc positions open – one for each project.  
Any recently graduated PhD interested?

→ contact me

## Fields:

- Modeling and Simulation,
- Human Factors,
- Computer Science,
- HSI.



# The Team

